

## CHAPTER 5

### MISCELLANEOUS

5-1. Turnouts. Normally, No. 8 turnouts will be installed. Larger or smaller turnouts may be installed only if required by unusual local conditions. The track layouts for various conditions, using No. 8 turnouts (8-foot 3-inch theoretical heel distance), are described in appendix A. No. 8 self-guarded frogs will be installed at Army installations within the United States when the design train speed does not exceed 30 miles per hour. Switch stand will be placed, if possible, on the turnout side of the track; however, in double-track territory, the stand will be placed on the right-hand side of the track, whenever possible. The switch stand will be of a standard low-type construction. Normally, reflector switch lamps only will be provided as switch stand targets. Colored reflector switch lamps with day target discs will be used only at important turnouts subject to considerable traffic. Illuminated switch lamps will not be provided except as required by the serving railroad or specific safety regulation.

5-2. Crossing frogs. Crossing frogs are costly to install and maintain. Therefore, their use should be avoided whenever practicable. When required, crossing frogs will conform to AREA trackwork plans.

5-3. Structures. Structures, as discussed herein, carry the weight of moving equipment on railroad tracks. The design and specifications of the serving railroad or the AREA Manual for Railway Engineering, modified where necessary, may be used. In order to provide for the standard interchange car, design strength will not be less than that required for Coopers E-80 loading; however, the design strength could be stronger if conditions warrant.

5-4. Track scales. Railroad track scales will not be provided for depots or troop-housing areas. They will be provided at other installations only if necessary from both an operating and economical standpoint.

5-5. Guardrails. Two inner guardrails will be installed on all single track bridges and trestles. Each guardrail will be 11 inches from the traffic rail and will extend at least 30 feet beyond each end of the bridge or trestle. One guardrail will be placed on each track of double-track bridges or trestles.

5-6. Highway-railway grade crossing. The grade crossing of a highway will be suitable for the volume of highway traffic and train traffic and appropriate for the physical characteristics of the site. Typical railroad crossing design can be found in the AREA Manual for Railway Engineering.

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a. Drainage. Each crossing will have adequate drainage. Underdrainage will be installed if side drainage does not prevent formation of water pockets.

b. Width of crossing. Crossing pavements and/or timbers on roads or driveways in warehouses, storage or industrial areas, and on all roads with curbs will extend at least 2 feet on each side of the approach highway pavement. Crossing pavements and/or timbers on primary or secondary roads without curbs will extend through the full width of roadway including shoulders.

c. Crossing approaches. Approaches to the track will be on a smooth grade with no abrupt breaks so that vehicles with low road clearance may pass over the crossing without touching the rail or surface.

d. Rails. Rails will be laid to eliminate joints within the crossing with the nearest joint not less than 6 feet from the crossing. Where necessary, long or welded rails will be used. Rails will be double spiked, and the track solidly tamped to uniform surface.

e. Flangeway widths. Flangeways 2-1/2 inches minimum width will be provided on tangent track or on curves of 8 degrees or less, and 2-3/4 inches minimum width on curves of more than 8 degrees.

f. Signs and signals. The type of crossing protection will be determined by the physical characteristics of the crossing, density, and type of highway and rail traffic.

g. Public crossings. Public crossings, drainage, signs, crossing protection, and approaches not located within a project will conform to the requirements of the state or municipality and the recommendations of the AREA. The installation of any mechanical protecting device required by public regulation will be covered by an agreement with the highway agency.

5-7. Grounding. Railroad spur tracks or tracks for unloading or filling tank cars with aircraft or automotive fuels will be located not less than 65 feet from the center line of other tracks and not less than 100 feet from the shell of an aboveground tank or from an existing building or future building not considered a part of the tank farm. This restriction is for blast distance. Should site conditions dictate distances less than those stated above, waiver must be obtained from the using service. Grounding will be provided at 100-foot intervals, or major fractions thereof, for effectively discharging electrical potentials generated by static and lightning before these charges are permitted to accumulate to the point of discharge across an air gap causing a source of ignition of hazardous mixtures. Grounding will include bonding between rail sections, installation of ground electrodes, connections between ground electrodes and rails, and

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interconnection of spur track with building grounding systems where they are within 25 feet of each other.

a. Electrodes. Ground electrodes normally will consist of 8-foot-long by 3/4-inch-diameter copper-clad steel rods or 1-inch-diameter zinc-coated steel pipe. Electrodes will be driven vertically to a depth sufficient to have the top not less than 12 inches below the roadbed surface at the ballast toe on one side of the track. Where the roadbed is rocky, preventing full length installation of the ground electrodes, not less than 15 feet of No. 1/0 American Wire Gage (AWG) bare stranded copper wire will be laid in a trench and covered with not less than 6 inches of material arranged to remain in place, unless other provisions are required by the using service.

b. Ground connections and bonding. Rail sections will be bonded together with not less than No. 1/0 AWG (3/8-inch diameter) bare stranded copper conductor, and the sections terminating beyond the 100-foot distance will be electrically insulated from the remaining rails. Conductors between rails and ground electrodes, and interconnections between grounding systems will be of No. 2 AWG bare stranded copper installed not less than 12 inches below the roadbed surface. Connections will be of the bolted, thermochemical, or other approved permanent type. Bolted connectors will be of the pressure bar type having no rotating parts coming in direct contact with conductors.